

## WHAT IS CLAIMED IS:

1. A catheter system comprising:
  - 5 an insulated needle having a proximal end configured for fluid connection and a distal end configured for insertion through tissue and into a vicinity of a nerve or nerve plexus within a patient;
  - an electrically conductive wire coupled for supplying an electrical current to the  
10 insulated needle;
  - a catheter introducer having a distal end and a proximal end, wherein the distal end is made integral with the proximal end of the insulated needle; and
  - 15 a catheter configured for insertion within and through the catheter introducer and the insulated needle, wherein the catheter is adapted to administer fluids within the vicinity of the nerve or nerve plexus.
2. The catheter system as recited in claim 1, wherein the proximal end of the  
20 insulated needle comprises a hub.
3. The catheter system as recited in claim 2, wherein the hub is permanently attached to the distal end of the catheter introducer by an adhesive material.
- 25 4. The catheter system as recited in claim 2, wherein the hub and the distal end of the catheter introducer are molded to form a single component of the catheter system.
5. The catheter system as recited in claim 1, wherein the proximal end of the catheter introducer comprises an integral catheter threading assist guide to facilitate threading of  
30 the catheter through the catheter introducer and the insulated needle.

6. The catheter system as recited in claim 5, wherein the catheter threading assist guide comprises:

5 a cap portion in rotational securement with the distal end of the catheter introducer;

an elastic tube arranged about a rotational axis of the catheter threading assist guide and fixedly attached to the cap portion and to the distal end of the  
10 catheter introducer; and

wherein rotation of the cap portion relative to the distal end of the catheter introducer modifies an internal diameter of the elastic tube.

15 7. The catheter system as recited in claim 6, wherein rotation of the cap portion reduces the internal diameter to seal an orifice of the catheter threading assist guide against fluid leakage when the catheter is not arranged within the catheter introducer.

8. The catheter system as recited in claim 6, wherein rotation of the cap portion  
20 reduces the internal diameter to form a continuous, fluid-tight seal about the catheter when it is arranged within the catheter introducer.

9. The catheter system as recited in claim 8, wherein the catheter threading assist guide is configured for maintaining the continuous, fluid-tight seal about the catheter  
25 before, during and after the catheter is inserted into the catheter threading assist guide.

10. The catheter system as recited in claim 8, wherein the catheter threading assist guide is configured for maintaining the continuous, fluid-tight seal about an epidural or peripheral nerve catheter of substantially any size.

30

11. The catheter system as recited in claim 5, wherein the distal end of the catheter introducer comprises a side port that is coupled, through flexible tubing, to a fluid source and configured for fluid connection to the proximal end of the insulated needle.

5 12. The catheter system as recited in claim 11, wherein the side port extends in an orthogonal direction from a side surface of the distal end of the catheter introducer.

13. The catheter system as recited in claim 13, wherein the side port extends from a side surface of the distal end of the catheter introducer at an acute angle from a  
10 longitudinal axis of the catheter system.

14. A catheter system, comprising:

an insulated needle having a proximal end and a distal end, wherein the distal end  
15 is configured for insertion through tissue and into a vicinity of a nerve or nerve plexus within a patient;

a side port extending from a side surface of the proximal end of the insulated  
needle at an acute angle from a longitudinal axis of the catheter system;

20 an electrically conductive wire coupled for supplying an electrical current to the insulated needle; and

a catheter configured for insertion through the side port and the insulated needle  
25 for administration of fluids within the vicinity of the nerve or nerve plexus.

15. The catheter system as recited in claim 14, wherein an upper aspect of the proximal end of the insulated needle is coupled, via flexible tubing, to a fluid source.

30

16. The catheter system as recited in claim 14, wherein the acute angle consists of essentially any angle substantially less than 90 degrees from the longitudinal axis.

17. The catheter system as recited in claim 16, wherein the acute angle consists of  
5 essentially any angle less than or equal to 45 degrees from the longitudinal axis.

18. The catheter system as recited in claim 14, wherein the side port comprises a catheter threading assist guide to facilitate threading of the catheter through the insulated needle.

10

19. The catheter system as recited in claim 18, wherein the catheter threading assist guide comprises an end cap coupled for sealing an orifice of the catheter threading assist guide against fluid leakage when the catheter is not arranged within the catheter threading assist guide, and wherein a user of the catheter system can easily remove the end cap with  
15 one hand while threading the catheter with the other hand.

20. The catheter system as recited in claim 19, wherein the end cap comprises a flip-top style cap.

20 21. The catheter system as recited in claim 19, wherein the end cap comprises a hinged style cap.

22. The catheter system as recited in claim 19, wherein the end cap comprises a screw cap.

25

23. The catheter system as recited in claim 19, wherein the catheter threading assist guide is made integral with the side port, and wherein the catheter threading assist guide comprises:

30 a cap portion in rotational securement with the side port;

an elastic tube arranged about a rotational axis of the catheter threading assist guide and fixedly attached to the cap portion and to the side port; and

5        wherein rotation of the cap portion relative to the side port modifies an internal diameter of the elastic tube.

24.    The catheter system as recited in claim 23, wherein rotation of the cap portion reduces the internal diameter to seal an orifice of the catheter threading assist guide  
10        against fluid leakage when the catheter is not arranged within the catheter introducer.

25.    The catheter system as recited in claim 23, wherein rotation of the cap portion reduces the internal diameter to form a continuous, fluid-tight seal about the catheter when it is arranged within the catheter introducer.

15

26.    The catheter system as recited in claim 25, wherein the catheter threading assist guide is configured for maintaining the continuous, fluid-tight seal about the catheter before, during and after the catheter is inserted into the catheter threading assist guide.

20        27.    The catheter system as recited in claim 25, wherein the catheter threading assist guide is configured for maintaining the continuous, fluid-tight seal about an epidural or peripheral nerve catheter of substantially any size.

28.    A method for administering local anesthetic or other fluids to a nerve or plexus of  
25        nerves within a patient, the method comprising:

providing a catheter system, comprising (i) an insulated needle having a proximal end configured for fluid connection and a distal end configured for insertion through tissue and into a vicinity of the nerve or plexus of nerves,  
30        (ii) a catheter introducer having a distal end and a proximal end, wherein

the distal end of the catheter introducer is made integral with the proximal end of the insulated needle, and wherein the proximal end of the catheter introducer comprises:

5 a cap portion in rotational securement with the distal end of the catheter introducer; and

an elastic tube arranged about a rotational axis of the catheter introducer and fixedly attached to the cap portion and to the distal end of the catheter introducer; and

10

preloading a catheter within the catheter introducer and into the proximal end of the insulated needle before the insulated needle, or any other component of the catheter system, is inserted within the patient, wherein the catheter is adapted for administration of local anesthetic or other fluids.

15

29. The method as recited in claim 28, before, during or after the step of preloading a catheter, the method further comprising rotating the cap portion to wrap an inner surface of the elastic tube around an outer surface of the catheter, thereby reducing an inner diameter of the elastic tube to provide a continuous, fluid-tight seal around the outer surface of the catheter, thus permitting, if desired, axial and rotational movement of the catheter within the elastic tube without loss of the continuous, fluid-tight seal.

20

30. The method as recited in claim 29, after the step of preloading a catheter, the method further comprising:

25

inserting the distal end of the insulated needle through the tissue of the patient; and

detecting when the distal end of the insulated needle is in the vicinity of the nerve or nerve plexus by supplying an electrical current to the insulated needle via an electrically conductive wire coupled thereto.

5     31.     The method as recited in claim 30, further comprising withdrawing fluid from the vicinity of the nerve plexus through a side port of the distal end of the catheter introducer to verify correct positioning of the distal end of the insulated needle relative to the nerve plexus, wherein the step of rotating the cap portion prevents fluid leakage during the step of withdrawing the fluid.

10

32.     The method as recited in claim 30, further comprising administering local anesthetic after forwarding the catheter through the insulated needle and into the vicinity of the nerve plexus, wherein the step of rotating the cap portion prevents fluid leakage during the step of administering local anesthetic.

15

33.     The method as recited in claim 32, further comprising administering fluids to the patient through a flexible tube, which is coupled to a side port of the distal end of the catheter introducer, any time after the step of inserting the distal end of the insulated needle through the tissue of the patient, wherein the step of rotating the cap portion prevents fluid leakage during the step of administering fluids.

20

34.     The method as recited in claim 35, further comprising providing the side port and the flexible tube with individual configurations that allow the step of administering fluids to be conducted without interference with anatomical features of the patient.

25

35.     The method as recited in claim 34, wherein the step of administering local anesthetic and the step of administering fluids are conducted without a need for removing components from the catheter system.

36. The method as recited in claim 35, wherein the steps of rotating the cap portion and preloading the catheter function to simplify control of the catheter system by enabling a user to perform the step of rotating the cap portion using only one hand, while performing the step of preloading the catheter with the other hand.

5

37. The method as recited in claim 36, wherein the step of preloading the catheter, the step of rotating the cap portion, the step of providing the side port and the flexible tube, and the steps of administering local anesthetic and fluids function to minimize movement of the catheter system after the insulated needle is inserted within the tissue of the patient.

10